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**COUPON DELIVERY VIA MOBILE PHONE BASED ON LOCATION**

**CROSS REFERENCE TO RELATED APPLICATION**

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The present application is related to co-pending U.S. Patent Application Serial No. 09/240,963 (IBM Docket No. AT9-98-913) filed 01/29/99. The above mentioned patent application is assigned to the assignee of the present invention. The content of the cross referenced co-pending application is hereby incorporated herein by reference.

**BACKGROUND OF THE INVENTION**

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**1. Technical Field:**

The present invention relates to mobile communications systems and more specifically to the use of mobile communications systems for accessing goods and services.

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**2. Description of Related Art:**

Many merchants offer coupons for services and products. These coupons can take many forms and are redeemed by consumers in order to receive discounts. However, consumers may not always be aware of potential coupons available to them at various locations, especially when the consumers are traveling or are away from home. Whether shopping around town or traveling cross country, consumers do not have a ready means of discovering and taking advantage of coupons offered by local merchants.

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Given the near ubiquity of mobile phones, laptop computers and other portable communications devices, consumers should be able to remotely access a data base containing information about coupons for services and  
5 products offered at the consumers' current location.

Currently, there is no method for consumers to use mobile communications means to find local merchants offering coupons. Therefore, it would be advantageous if a consumer could find relevant coupons based on his or  
10 her location, in proximity to the current mobile communication transmitting station.

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### SUMMARY OF THE INVENTION

The present invention provides a method for  
5 delivering coupons to consumers via mobile communication  
devices, based on location. The present invention  
includes an electronic database of merchant coupons.  
Users can then access the database by means of mobile  
phone, laptop computer, personal digital assistant (PDA)  
10 or other mobile device. The user receives a menu of  
service preferences such as retail, dining, automobile  
service, lodging and entertainment and selects the  
desired services. Coupons for merchants in the user's  
vicinity are then sent to the user. The coupons are  
15 chosen based on the selected preferences and the user's  
location, which is determined according to the remote  
transmitting tower through which the user's signal is  
being sent.

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### BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the  
5 invention are set forth in the appended claims. The  
invention itself, however, as well as a preferred mode of  
use, further objectives and advantages thereof, will best  
be understood by reference to the following detailed  
description of an illustrative embodiment when read in  
10 conjunction with the accompanying drawings, wherein:

**Figure 1** depicts a schematic diagram illustrating a  
mobile communication system within which the present  
invention may be implemented;

**Figure 2** depicts a block diagram of a data  
15 processing system which may be implemented as a server in  
accordance with the present invention;

**Figure 3A** depicts a diagram illustrating a mobile  
phone in accordance with a preferred embodiment of the  
present invention;

**Figure 3B** depicts a block diagram illustrating the  
20 hardware configuration of a mobile phone in accordance  
with a preferred embodiment of the present invention;

**Figure 4** depicts a flowchart illustrating a method  
for delivering coupons via mobile phone based on  
25 location, in accordance with the present invention;

**Figure 5** depicts a flowchart illustrating the method  
of the present invention from the perspective of a  
server;

**Figure 6A** depicts tables illustrating a relational  
30 database used to store and update merchant data in  
accordance with the present invention;

**Figure 6B** depicts a flowchart illustrating a method

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for retrieving a coupon from the relation database; and

**Figure 7** depicts a flowchart illustrating an example of how a customer may redeem an electronic coupon in accordance with the present invention.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to **Figure 1**, a schematic diagram  
5 illustrating a mobile communication system within which  
the present invention may be implemented is depicted.  
The architecture depicted in **Figure 1** is that of a simple  
mobile phone system. However, it must be kept in mind  
that the present invention can be used with any form of  
10 wireless communication system capable of determining the  
user's location. **Figure 1** is presented merely as an  
example.

In mobile phone network **100**, communication begins  
when a user activates a mobile phone **102**. The phone **102**  
15 must first establish contact with a base station, which  
is a collection of equipment that communicates with other  
mobile phones. In **Figure 1**, transmitting towers **104-112**  
are base stations within mobile phone network **100**. Each  
base station **104-112** covers a geographical area. A  
20 mobile phone system may consist of up to thousands of  
base stations, covering a large region. Upon activation,  
phone **102** begins scanning several control channels. Each  
channel carries signals from one of the base stations  
**104-112** in the vicinity of phone **102**. The specific  
25 channel to which phone **102** may tune can be assigned in  
several ways. As an example, phone **102** may tune to the  
channel with the strongest signal. However, other  
methods for the initial assignment of a mobile phone to a  
particular base station are available and well known  
30 within the art. In the example of **Figure 1**, phone **102**  
has tuned in to the control signal from base station **104**.

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When the user of the phone **102** wants to transmit a signal, the phone **102** sends a service request to base station **104**, which includes the phone number the user is trying to reach. Base station **104** then relays the  
5 request from phone **102** to a switch **114**. This switch **114** is responsible for moving information through the fixed parts of the communications network **100** and is connected to a server **200**. Switch **114** is responsible for all of the communications between the base stations **104-112** and  
10 can communicate by means of wireless or ground line connections such as, for example, fiber optics or microwave links.

Mobile communications network **100** might rely on Wireless Application Protocol (WAP) for facilitating  
15 communications. WAP is a standard for providing wireless phones, pagers and other handheld devices with secure access to e-mail and text-based Web pages. WAP provides a complete environment for wireless applications that includes a wireless counterpart of TCP/IP and a framework  
20 for telephony integration such as call control and phone book access. WAP features the Wireless Markup Language (WML), which was derived from Phone.com's HDML and is a streamlined version of HTML for small screen displays. It also uses WMLScript, a compact JavaScript-like language  
25 that runs in limited memory. WAP also supports handheld input methods such as a keypad and voice recognition. Independent of the air interface, WAP runs over all the major wireless networks in place. It is also device independent, requiring only a minimum functionality in  
30 the unit so that it can be used with a myriad of phones and handheld devices.

Switch **114** takes the request received from phone **102**

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via base station **104** and establishes a connection with the target designated in the request. The target may be mobile or fixed, and may be within communications network **100** or within another communications network.

5        If the mobile phone **102** is moving, the switch **114** may receive a report from the original base station **104** indicating that the signal from phone **102** is getting weaker. At this point, the switch **114** sends messages to the other base stations **106-112** asking for reports as to  
10   the relative strength of the signal coming from phone **102**. If, for example, base **108** reports a strong signal, the switch **114** will initiate a "handoff" from base **104** to base **108**, which requires the phone **102** to tune in to the traffic channel of base **108**.

15        Referring to **Figure 2**, a block diagram of a data processing system which may be implemented as a server, such as server **200** in **Figure 1**, is depicted in accordance with the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including  
20   a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to  
25   system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI  
30   local bus **216**. A number of modems **218-220** may be connected to PCI bus **216**. Typical PCI bus

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implementations will support four PCI expansion slots or add-in connectors. Communications links to network computers may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, server **200** allows connections to multiple network computers. A memory mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may be, for example, an IBM RS/6000, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system.

With reference now to **Figure 3A**, a diagram illustrating a mobile phone, similar to phone **102** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention. Mobile phone **300** includes a display **306** for presenting textual and graphical information. Display **306** may be a known display device, such as a liquid crystal display (LCD)

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device.

Mobile phone **300** may also include keypad **308**,  
speaker **314**, and microphone **316**. The keypad may be used  
to enter, for example, telephone numbers, user  
5 identification information, and commands for interacting  
with the interface. Audio feedback may be presented via  
speaker **314**. In addition to normal voice conversation,  
feedback may include other information, for example,  
location. And microphone **316** can be used not only for  
10 voice conversation, but for entering specific voice  
commands for voice actuated functions.

Mobile phone **300** also includes antenna **318**, which is  
necessary for establishing wireless communication links  
with remote transmitting towers, similar to towers  
15 **104-112**, in **Figure 1**.

Turning now to **Figure 3B**, a block diagram  
illustrating the hardware configuration of a mobile phone  
is shown in accordance with a preferred embodiment of the  
present invention. Mobile phone **350** is an example of the  
20 possible hardware configuration of mobile phone **300** in  
**Figure 3A** and illustrates the increasing sophistication of  
modern mobile phone designs.

Mobile phone **350** employs bus architecture. Processor  
**352** and main memory **354** are connected to bus **360**. Display  
25 adapter **356**, keypad adapter **358**, storage **362**, and audio  
adapter **364** are also connected to bus **360**. Mobile phone  
**350** also includes wireless link **366** connected to bus **360**.

Those of ordinary skill in the art will appreciate  
that the hardware in **Figure 3B** may vary depending on the  
30 implementation. Other internal hardware or peripheral  
devices may be used in addition to or in place of the

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hardware depicted in **Figure 3B**. The depicted example in **Figure 3B** and above-described examples are not meant to imply architectural limitations.

Although the depicted representation shows a  
5 specialized device, other embodiments of the present invention may be implemented in other types of devices such as pagers, personal digital assistants (PDA), palmtop computers, laptop computers with wireless modems, and any other type of wireless communications device.

10 Referring to **Figure 4**, a flowchart illustrating a method for delivering coupons via mobile phone based on location is depicted in accordance with the present invention. The example in **Figure 4** makes use of the ability to track the location of users of mobile phones,  
15 as described in **Figure 1**. However, it should be pointed out that the present invention is not limited to use with mobile phones.

The present invention involves a central database of merchants offering coupons, which can be remotely  
20 accessed by consumers using a mobile communications device, such as a mobile phone. This database can be stored on a data processing system within the phone company, such as server **200** described above. In the example presented in **Figure 4**, merchants who wish to  
25 offer coupons to potential customers subscribe with a telephone company (**step 401**). The phone company will then place the merchants and a list of their coupons within a central database.

Coupons are targeted to unique phone customers based  
30 on the user demographic (i.e. male, female, calling plan analysis, calling plan usage, etc.). The phone company maintains these records. For example, if the phone user

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travels frequently to another city, that caller is a more likely candidate to use visitor services such as hotels, restaurants, etc., than a local customer. The phone company uses that calling plan analysis and offers  
5 merchants the ability to target coupons based on that data mining. As another example, the phone company can create a "traveler user profile" database which merchants can use to determine whether or not to target coupon delivery. In that case, the merchant scans the database  
10 to determine if any product (and coupon) is adequate for the profile.

It is likely the merchant will pay a fee for any coupon delivered to all users that fit a certain profile. The phone company may provide unrestricted access to all  
15 merchants, and only coupons delivered are charged to the merchants. The merchant may also specify that coupons are to be delivered to phone users within a particular geographic area (or group of areas) that fit a certain profile. Once a merchant scans the user profile  
20 database, the merchant can create and store electronic coupons in the phone company's coupon database. These coupons would contain features selected by the merchant. For example, the merchant will select which goods or services will be covered by the coupons, how much of a  
25 discount to offer, the business hours during which the coupons are valid, and any other features that would normally be found with paper coupons.

If consumers wish to find out about coupons offered in the vicinity of their present location, they can use a  
30 mobile phone to dial up the database of merchant coupons (**step 402**). The server in the phone system determines the location of the user (**step 403**). This can be

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accomplished by referencing the base station through which the user's request is being sent, as described in **Figure 1**. In addition, the phone system can also triangulate the exact location of the phone itself, which is a method presently being adopted throughout United States for purposes of emergency services, such as 911 calls.

When the database is accessed, the phone provides a menu from which the user can select service preferences (**step 404**). The menu can be presented as an audio menu, a text menu, or displayed as a graphical user interface (GUI). The service preferences to choose from might include, for example, retailers, restaurants, car services, lodging, and entertainment. A generic preference to receive all coupons for a particular area could also be provided in the menu. The preference menu may also include the intended destination of the user. The user then chooses among the list of preferences in the menu (**step 405**). Entering the choice of preference can be done either verbally, by means of the keys on the phone, or through a touch screen interface on the phone. This process is an example of a "pull" method, in which the user actively enters specific data and requests coupons from the database.

Instead of selecting preferences every time the database is accessed, the user may store a set of preselected preferences (i.e. electronics and sporting goods) and create his or her own user profile, which the database will automatically filter on. This is an example of a "push" method, in which the system already possesses the required data and can automatically send coupons to the user. These preselected preferences may

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be stored in the mobile phone or by the phone company. However, if preferences are preselected, the user still has the option of returning to a more general menu and selecting other preferences.

5       As another example of the push method, whenever a phone user that fits a certain profile enters a prescribed region, the coupon(s) is delivered to the user's phone automatically. The phone might be equipped with a menu option to preset whether to accept or reject  
10 coupon delivery. If the user selects accept, for example, all coupons are sent to the phone (duplicate coupons are rejected). Even if the user does not subscribe to text messaging, coupons could be provided for free to the consumer. This is an option for the  
15 phone company.

          The system transmits coupons to the user, based on the user's location and selected preferences (**step 406**). The coupons can be selected for merchants within a prescribed radius of the user's location. This radius  
20 will vary according to the number of base station regions within a communications network and may even overlap with other base station regions. The prescribed radius can also vary depending on the geographic density of merchants. For example, in Montana, the prescribed  
25 radius may be 20 miles, while in Manhattan, the radius may be five blocks. This radius data is stored within the phone system. The phone company provides a set of profiles to which the merchants may subscribe. As an example, a "roaming traveler" profile could be targeted  
30 if the phone user is anywhere in a geographical area (e.g. in this city), or a "local user" profile for local users within 5 miles of the base station location. Once

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a merchant selects the profile, the phone company targets phone users that fit that profile. A user's travel history can also be used to create a customized traveler profile. Coupons could then be broadcast to users who regularly travel into a given area.

**Figure 5** depicts a flowchart illustrating the method  
20 of the present invention from the perspective of a  
server, such as server data processing system **200** from  
**Figure 2**.

Merchants subscribing with the phone company or internet service provider (ISP) are entered into the database of merchant coupons (**step 501**). Requests are then received from users by means of a mobile communications device (**step 502**). As explained in reference to **Figure 4**, many devices may be used to access the database server. The server responsible for the coupon database is accessed on a dedicated channel, independent of the other channels used for normal communications, such as voice conversation. This channel

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may utilize WAP, as described in reference to **Figure 1**. The server then determines the location of the user (**step 503**). As stated in reference to **Figure 4**, this can be accomplished by referencing the base station through which the user's request is being sent or triangulating the exact location of the phone itself. The server then transmits a menu of service preferences to the user (**step 504**). As described above, these preferences relate to the types of goods and/or services the user may wish to purchase. The server then receives the user's selection of preferences (**step 505**). As noted above, the preferences might be stored in the mobile phone, or by the phone company, in which case the server would automatically receive the preferences when the user signs on in **step 502**.

The server must then locate merchants within the user's vicinity that provide coupons on the goods and/or services which the user wishes to purchase. Merchants within a predefined radius are selected from the database according to the service preferences of the user (**step 506**). Coupons redeemable with the selected merchants are then transmitted to the user (**step 507**). The coupons may be downloaded as WML files, as described in reference to **Figure 1**, or some other type of wireless protocol file and can be stored in a coupon folder within the phone, similar to storing phone numbers. The phone can alert the user when a coupon is downloaded or when a coupon is about to expire, similar to alerting the user of an incoming call or voice message.

Referring to **Figure 6A**, tables illustrating a relational database used to store and update merchant data are depicted in accordance with the present

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invention. The first table contains specific information associated with a particular merchant identification (MID). The second table contains information concerning an item (i.e. good or service) and relates that  
5 information to a coupon and MID.

The flow used by the database to retrieve coupons is illustrated in **Figure 6B**. The database first determines the user request (**step 601**). This request can be in the form of a preference selection, as explained above, or a  
10 specific request for a particular item. The database then constructs a query (**step 602**) to search the item/coupon table to determine the MIDs of merchants who offer coupons for the designated item(s) and which of those merchants are within the specified radius of the  
15 user. Coupon choices are then presented to the user for selection (**step 603**). The user then selects a coupon(s) (**step 604**). A coupon with the merchant's name, address, phone number, and conditions is downloaded to the user's phone (**step 605**). Optionally, the coupons can be  
20 downloaded to the user's phone immediately after **step 602**, and the user can select the desired coupons at a later time.

The user can then redeem the coupons with the participating merchants. The coupons which are  
25 transmitted to the user's mobile phone may take many forms including, for example, an electronic coupon, a text message or a graphical ad. The coupons could be set to automatically expire based on time (e.g. one day from deliver), or if the phone user leaves the "profile area"  
30 (e.g. the roaming user leaves the roaming area). Expired coupons would then be deleted from the phone's memory.

The phone can provide a menu from which the user

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selects the coupons which have been delivered. The coupons contain information about how to redeem the value. This might be done by means of a redemption code or a phone number. In addition, the coupons may contain  
5 information about the merchant, such as location, hours of business, and even an option to connect directly to the merchant. If the coupon does contain the option to connect directly, the connection might be specific, such as connecting directly to a particular department rather  
10 than the central operator. Another example would involve connecting directly with the reservation desk at a restaurant or hotel.

In addition to providing the user with information about the merchant, the merchant may also be sent  
15 information about the user including, for example, name and preferences. Such information would allow the merchant to provide better service. The merchant may also be notified every time a coupon has been sent to a user, so that the merchant is given a "heads up" and will  
20 be expecting the customer.

Referring to **Figure 7**, a flowchart illustrating an example of how a customer may redeem an electronic coupon is depicted in accordance with the present invention. The customer proceeds to pay for the chosen product or  
25 service from the merchant and notifies the merchant of the coupon he wishes to redeem (**step 701**). The merchant may provide a communication link between a cash register and mobile phone so that the customer may provide evidence of the existence of a coupon (**step 702**). This  
30 may include an infrared data link between mobile phone and a cash register or some other type of data link. Another example would be to have an application in the

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phone or an applet in the coupon which could send the coupon to the merchant's register. In any case, the merchant may optionally require redemption information for the redeemed coupon, such as redemption ID stored in the electronic coupon (**step 703**). The redemption ID may allow a merchant to verify that the customer is entitled to coupon value applied against the purchase price of the product or service. The merchant then applies coupon value to the current purchase (**step 704**). The coupon database, stored within a phone company server, receives information concerning the redeemed coupon and updates a redeemed coupon database (**step 705**). The merchant may use the redemption ID to mark within the database that a coupon with the particular coupon ID has been already been used. In this manner a merchant may ensure that a customer does not attempt to reuse a coupon.

Alternatively, the merchant may allow an electronic coupon to be reused. In essence, the electronic coupon then becomes a standing coupon that may be used repeatedly by the customer. While browsing through the coupons on the mobile phone, the customer may see that the coupon may be reused in a variety of manners. The coupon may state in text that it is reusable, or the coupon properties may be set to show that it is reusable or renewable. In another manner, the expiration date of the coupon could be reset by the merchant as a purchase reward for purchasing a product within a specific time period.

While the present invention is applicable to anyone away from home, it is of particular value to travelers who may be very far from home and are unfamiliar with their surroundings. Travelers are unlikely to know much

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about their present location, let alone which merchants are offering coupons. The present invention will greatly assist travelers in locating goods and services that they normally would not have access to.

5       It should be emphasized that the present invention has applications beyond the use of mobile phones. For example, the database of merchant coupons could be accessed by means of a pager, laptop computer, personal digital assistant (PDA), or any other type of wireless  
10       communications device. In addition to a phone company, the coupon database could be provided by an internet service provider or other types of mobile communication providers.

15       The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in  
20       order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.

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